



# OPERATIONS AND MAINTENANCE REPORT

## SECOND QUARTER OF THE SECOND BASELINE PHASE, NORTH AND SOUTH FILLS

**Sharkey Landfill Superfund Site  
Morris County, New Jersey**

**Prepared for:** Sharkey Landfill Agreement Group  
Technical Committee

**Submitted By:** Golder Associates Inc.  
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**June 2015**

**Project No. 943-6198-003**

389901





June 18, 2015

Project No.: 943-6198-003

Ms. Pamela J. Baxter, Project Manager  
United States Environmental Protection Agency  
Region II Headquarters  
290 Broadway, 19th Floor East  
New York, NY 10007-1866

**RE: OPERATIONS AND MAINTENANCE REPORT  
SECOND QUARTER OF THE SECOND BASELINE PHASE FOR THE NORTH AND SOUTH  
FILLS  
SHARKEY LANDFILL SUPERFUND SITE, MORRIS COUNTY, NEW JERSEY**

Dear Ms. Baxter:

On behalf of the Sharkey Landfill Agreement Group (Group), Golder Associates Inc. (Golder Associates) is pleased to present the United States Environmental Protection Agency (USEPA) with two (2) copies of this Operation and Maintenance Report, Second Quarter of the Second Baseline Phase associated with the North and South Fills for the Sharkey Landfill Remedial Design/Remedial Action project. This Operation and Maintenance Report summarizes the second quarterly monitoring event at the North and South Fills at the Sharkey Landfill Superfund Site (Site) conducted February through April 2015. This report has been prepared in accordance with the requirements of the Site Consent Decree. Results of water level (hydraulic) monitoring are not included with this report, as they are now managed by the Township of Parsippany-Troy Hills.

Sampling results from the above referenced sampling events do not indicate an exceedance of the Well Trigger Levels or River Trigger Levels in the North and South Fills. These results are consistent with the Remedial Design approach that the need for continued groundwater extraction at the North and South Fills may not be necessary.

The next quarterly monitoring event for the North and South Fills occurred in May 2015 and the next analytical sampling event for the Small Fills is tentatively scheduled to occur in Spring 2016.

Very truly yours,

**GOLDER ASSOCIATES INC.**

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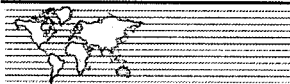
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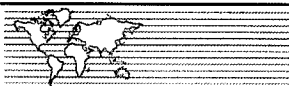
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## 1.0 INTRODUCTION

### 1.1 Report Requirements

This report is submitted as required by the Revised Final (100%) Design Report (Golder Associates, 2000) and presents the results of the second quarter of the Second Baseline Phase for the North and South Fills, which was conducted by Golder Associates Inc. (Golder Associates) from February 2015 through April 2015. The quarterly monitoring is required by Sections E.10 and E.12 of the Statement of Work (SOW)<sup>1</sup>. The Second Baseline Phase is designed to provide data to evaluate the effectiveness of the remedy. Specifically, Golder Associates collected samples from the groundwater monitoring wells on the North and South Fills and each surface water station in both the Rockaway and Whippany rivers (collectively referred to as "rivers") (R1 through R4 and W1 through W6) following the shutdown of the groundwater extraction system (GWES), which occurred in August 2014. The groundwater samples were analyzed for the Target Compound List (TCL) / Target Analyte List (TAL) chemicals, including the Well Chemicals (WC, Exhibit A of the SOW), and the surface water samples were analyzed for the TCL/TAL, including the River Chemicals (RC, Exhibit C of the SOW). Additionally, water level measurements were measured in the groundwater monitoring wells on the North and South Fills during the quarterly monitoring event.

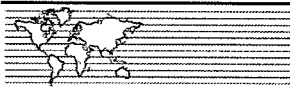
The Second Baseline Phase monitoring program was performed in accordance with Appendices B and C, *Performance Monitoring Field Sampling and Quality Assurance Plan for the Remedial Action (PMP)* and *Health and Safety/Contingency Plan for Operation and Maintenance Activities (HASCP)*, respectively, of the Revised O&M Plan (Golder Associates, 2005), and with the SOW, Appendix B of the Consent Decree. This report is submitted, as required, to both the USEPA and the New Jersey Department of Environmental Protection (NJDEP).

### 1.2 Project Background

The Sharkey Landfill Superfund Site (Site) is located in the Townships of Parsippany-Troy Hills and East Hanover, in Morris County, New Jersey. The Site is bounded by Route 46, New Road, and the Rockaway River and extends south beyond Interstate Route 280 between Troy Meadows and the Hatfield Swamp. The landfill Site is approximately 90 acres in size and is divided into five separate landfill areas: the North Fill, South Fill, Northwest-North Fill, Northwest-South Fill, and Southwest Fill.

In September 1983, the Site was included on the National Priorities List (NPL) as a result of assumed impacts from historic fill material. Various contractors for the NJDEP conducted a remedial investigation and feasibility study (RI/FS) through July 1986. The results of the RI/FS indicated the presence of low concentrations of organic (including pesticides) and inorganic compounds in soils, and low concentrations of organic and inorganic compounds in the shallow water beneath the Site. The shallow water bearing

<sup>1</sup> The Statement of Work (SOW) is Appendix B of the Consent Decree for Sharkey Landfill Superfund Site (December 1994).



zone beneath the Site that is referenced throughout this report ("shallow groundwater") is isolated both vertically and horizontally. As concluded in the RI, the shallow groundwater is isolated from deeper groundwater systems by a confining varved clay layer, which is continuous across the Site and beneath the Fill areas. The shallow groundwater beneath the Fill areas immediately discharges into the adjacent Rockaway and Whippany Rivers, which form hydraulic barriers for the lateral migration of the water beneath the Fill areas; hence the shallow water beneath the Site is isolated vertically and horizontally from regional groundwater systems.

Based on the results of the RI, the USEPA and NJDEP established cleanup goals and objectives for the Site. The USEPA selected a remedy to accomplish these goals, which is presented in the Record of Decision (ROD) (USEPA, 1986).

The USEPA modified the selected remedy and notified the public in the Explanation of Significant Differences (USEPA, 1993). The Consent Decree, issued by USEPA in 1994, outlines the responsibilities of the Group, the Township of Parsippany-Troy Hills, and others for remedial design, remedial action (RA), and Operations & Maintenance (O&M).

The Statement of Work (SOW), Appendix B to the Consent Decree, provides explicit details about the groundwater monitoring, surface water monitoring (collectively referred to as "monitoring"), and reporting requirements that are required during the O&M phase of the project. Specifically, the O&M requirements are provided in Sections E.10 through E.15 of the SOW. These sections provide separate criteria for groundwater versus surface water, and North and South Fills versus the three other (Small) fills. These sections also break down the O&M into the different phases of work (First Baseline, 5-Year Pump and Treat, Second Baseline, and Long-Term). The SOW Appendices also lists the analytical parameters that must be sampled and tested for during the O&M phase and the Well and River Trigger Levels that will be used to evaluate the effectiveness of the remedy.

The First Baseline Phase for the North and South Fills was completed in 2002 prior to the start-up of the GWES. For the First Baseline Phase, the groundwater at the Site showed only two (2) exceedances of the Well Trigger Levels. During the sampling events of the First Baseline Phase, several parameters exceeded the River Trigger Levels. These parameters were not believed to be associated with the landfill areas, and none of these exceedances were considered Trigger events. These initial sampling results continued to indicate that there does not appear to be elevated levels of the constituents of concern at the Site.

The hydraulic monitoring became the responsibility of the Township of Parsippany-Troy Hills in 2003. On April 21, 2005, the Group petitioned the USEPA within its rights under the Consent Decree to modify the SOW O&M requirements on the Small Fills. The USEPA responded and agreed to the requested

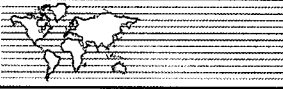


modifications to the O&M requirements in a letter dated July 20, 2005. As per the modified O&M requirements, the groundwater and surface water monitoring was then conducted on an annual basis.

The 5-Year Pump and Treat Phase for the North and South Fills was completed in 2007. There were no exceedances of the Well Trigger Levels at the Site in the composite samples collected as part of the 5-Year Pump and Treat Phase of the North and South Fills. These sampling results also continued to indicate that there does not appear to be elevated levels of the Site constituents of concern in the North and South Fills. Also, based on the results of the shallow groundwater level monitoring conducted in 2003, 2004, and 2005, the GWES at the North and South Fills appeared to be effective in achieving hydraulic capture of the shallow groundwater by reducing the overall shallow groundwater elevations at the Site. In 2008, the Township requested that the GWES on the North and South Fills be turned off. The request to turn the system off was approved by USEPA in July 2014. The system was shut down on August 18, 2014. The Township redeveloped the monitoring wells on the North and South Fills in April 2011 in anticipation of the Second Baseline Phase for the North and South Fills.

The First Baseline Phase for the Small Fills was completed in 2003, and Years One through Eleven of the Long-Term Phase for the Small Fills were completed in 2004 through 2014, respectively. There were no exceedances of the Well Trigger Levels at the Site in the 2003, 2004, and 2006 through 2014. In 2005, there was an exceedance of the Well Trigger Level for mercury in one (1) well on the Southwest Fill. However, it is not believed that the mercury result constitutes a trigger level exceedance because laboratory contamination of the sample was suspected, the historical results for the particular well and all other shallow groundwater monitoring wells in the Small Fills have been non-detect for mercury, and the resampling that was conducted at the well was non-detect for mercury. Bromodichloromethane exceeded the River Trigger Level in various surface water stations on several occasions in 2003, 2004, 2005, and 2006. However, bromodichloromethane is not believed to be associated with the landfill areas, and none of these exceedances are considered Trigger events. In 2007, acrylonitrile was detected at W-1(U), the furthest upstream sampling location, and not at any of the downstream locations; therefore, it was unlikely that the exceedance was associated with the landfill areas, and, as such, did not constitute a trigger level exceedance. There were no exceedances of the River Trigger Levels in 2008 through 2014.

On June 4, 2012, the Group petitioned the USEPA within its rights under the Consent Decree to modify the SOW O&M requirements on the Small Fills. The USEPA and USACE responded and agreed to the requested modifications to the O&M requirements in a letter and memorandum, respectively, dated December 12, 2012 and December 7, 2012, respectively. As per the modified O&M requirements, the groundwater and surface water monitoring will be conducted on a biennial basis with the next event scheduled for Spring 2016.



## 2.0 SECOND BASELINE PHASE MONITORING PROGRAM

### 2.1 Water Quality Monitoring Program

#### 2.1.1 Groundwater

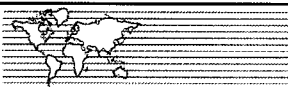
During the Second Quarter Monitoring Event for the Second Baseline Phase for the North and South Fills, Golder Associates collected groundwater samples from:

- Seven (7) monitoring wells on the North Fill (M-1, M-2, M-3, M-4, M-5, M-6, and M-27)
- Nine (9) monitoring wells on the South Fill (M-8, M-9A, M-10, M-11, M-12, M-13, M-14, M-15, and M-16)

The groundwater samples were analyzed for the TCL/TAL (Table 2 and Exhibit A of the SOW), including the WC list (Table 3 and Exhibit B of the SOW). The sample point identifications, sampling dates, and parameters analyzed are summarized in Table A-1 of Appendix A.

Fifteen (15) of the sixteen (16) groundwater samples were collected using the USEPA Region II low-flow purging and sampling method (USEPA, 1998), in accordance with the PMP (Appendix B of the O&M Plan). The wells were purged at a rate that ranged from approximately 0.3 to 0.4 liters per minute, with permanently installed, dedicated, pneumatic (Well Wizard™) bladder pumps. Water levels were monitored using an electronic water level meter and the pumping rate was maintained unless water level drawdown was observed, at which time the rate was reduced to maintain the initial water level as much as reasonably practicable. Monitoring well M-2's water level could not be maintained and was purged dry during low-flow purging. M-2 did not recharge sufficiently to collect sample volume for pesticides, polychlorinated biphenyls (PCBs), and cyanide analyses during Golder's first mobilization to the Site. Upon returning to the Site in April 2015, M-2 was purged dry again during low-flow purging and allowed to recharge prior to sample collection. Sufficient sample volume was collected from M-2 for pesticides, PCBs, and cyanide analyses during the April 2015 mobilization within 24 hours of purging M-2 dry. Field parameters were measured using a water-quality meter (Horiba U-52®) probe. Monitoring wells M-4, M-5, and M-12 were sampled using a non-dedicated submersible bladder pump due to structural issues prohibiting dedicated pumps from being installed prior to the First Quarter Monitoring Event.

Excluding Monitoring well M-2, each well was purged until the field parameters of temperature, pH, oxidation-reduction potential (ORP), turbidity, conductivity, and dissolved oxygen (DO) stabilized over a minimum of three (3) consecutive readings measured in a flow-through cell at approximate 5-minute intervals. This data was recorded on Groundwater Low Flow Purge/Sample Field Information Forms. Stabilization was considered complete when at least one (1) discharge tubing volume was purged and three (3) consecutive readings were within the following criteria:



- $\pm 10\%$  for temperature;
- $\pm 0.1$  standard units (std) for pH;
- $\pm 10$  millivolts (mV) for ORP;
- $\pm 10\%$  for turbidity, or under 10 nephelometric turbidity units (ntu);
- $\pm 3\%$  for conductivity; and
- $\pm 10\%$  for DO or  $\pm 0.1$  milligrams per liter (mg/l) if under 1.00 mg/l.

Once the parameters stabilized, the flow-through cell was disconnected and the groundwater sample was collected directly from the Teflon<sup>TM</sup>-lined tubing dedicated to each Well Wizard<sup>TM</sup>.

In addition to the primary groundwater samples, the following quality control (QC) samples were collected in accordance with the PMP:

- One (1) field duplicate (FD)
- One (1) matrix spike/matrix spike duplicate (MS/MSD)
- Three (3) trip blanks
- One (1) rinsate blank

All samples were collected so that the preservatives were not displaced from pre-preserved sample containers, such as the 40-milliliter (ml) volatile organic compound (VOC) vials. Immediately after sample collection, sample bottles were placed in a cooler with wet ice and the Chain of Custody (COC) form was completed and included with the cooler. The samples were maintained at approximately 4°C and shipped via Federal Express to the analytical laboratory in accordance with the PMP.

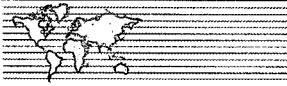
A summary of the stabilized field measurements (i.e., temperature, pH, ORP, turbidity, conductivity, and DO) is presented in Table 1. Appendix B provides a summary of detected compounds for the Second Quarter Monitoring Event for Second Baseline Phase for the North and South Fills.

### 2.1.2 Surface Water

Golder Associates collected samples from each surface water station in both the Rockaway and Whippany Rivers (R1 through R4 and W1 through W6) and analyzed for all TCL/TAL chemicals including the River Chemicals (Exhibits A and C of the SOW) during March 2015. The sample point identifications, sampling dates and parameters analyzed are summarized in Table A-1 of Appendix A. The sampling was conducted in March 2015, separate from the groundwater event, due to river access and safety issues created by frozen sample locations in February 2015.

Samples were collected using a sampling vessel (e.g., extendable pole with an attached tri-pour beaker). Golder Associates collected the samples by facing upstream, immersing the sample vessel (with a new tri-pour beaker at each location) into the water within the top twelve (12) inches, and then filling the





preserved sample containers from the sampling vessel taking care to not overflow the bottle resulting in loss of preservative. A low velocity area was chosen because high water velocity can cause the re-suspension of bottom deposits and bias the sample results. Disturbance of bottom sediments can also cause false field parameter readings. Prior to sample collection, a water quality meter (i.e., Horiba U-52®) probe was placed into the water adjacent to each sampling station and the field parameters (i.e., temperature, pH, specific conductivity, turbidity, and DO) were measured and recorded on the Surface Water Sampling Collection Form.

In addition to the primary surface water samples, the following quality control (QC) samples were collected in accordance with the PMP:

- One field duplicate sample
- One MS/MSD
- One trip blank

Immediately after sample collection, sample bottles were placed in a cooler with wet ice and the completed COC form. The samples were maintained at approximately 4°C and shipped via Federal Express to the analytical laboratory in accordance with the PMP.

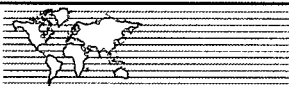
A summary of the field measurements (i.e., temperature, pH, ORP, turbidity, conductivity, and DO) is presented in Table 1. Appendix B provides a summary of the detected compounds for the Second Quarter Monitoring Event for Second Baseline Phase for the North and South Fills.

## 2.2 Analytical Parameters and Methodologies

The complete list of analytical parameters required as part of the Second Baseline Phase for the North and South Fills is presented in Tables 2, 3, and 4. These parameters can be subdivided into the following general groups:

- TCL/TAL Chemicals (VOCs, semi-volatile organic compounds (SVOCs), inorganics, and pesticides, and PCBs);
- Well Chemicals (WC) (VOCs, SVOCs, and inorganics);
- River Chemicals (RC) (VOCs); and
- Field Parameters.

CompuChem of Cary, North Carolina performed all of the analyses in accordance with the PMP. The organic parameters (VOCs, SVOCs, pesticides, and PCBs) were analyzed in accordance with the USEPA Contract Laboratory Program (CLP) *Statement of Work for Organics Analyses Multi-Media, Multi-Concentration Organics Analysis, SOM01.2* with the exception of VOCs for the surface water samples. Inorganics were analyzed using CLP *Statement of Work for Inorganics Analyses Multi-Media, Multi-*



*Concentration, ILM05.4.* Golder Associates<sup>2</sup> analyzed the field parameters during sampling in accordance with the PMP.

The surface water VOCs were analyzed in accordance with the USEPA CLP *Statement of Work Statement of Work for Organics Analyses Multi-Media, Multi-Concentration Organics Analysis Trace Volatile Organic Compounds, SOM01.2* using a 25 ml purge volume to achieve detection limits low enough to meet the volatile compound River Trigger Levels. As part of the RC list, the surface water samples were also analyzed for three (3) additional volatile compounds: acrolein, acrylonitrile, and 2-chloroethyl vinyl ether in accordance with USEPA SW846 *Volatile Organic Compounds by Gas Chromatography/Mass Spectrometry (GC/MS), Method 8260B*.

## 2.3 Data Validation

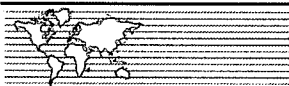
Golder Associates validated 100% of the analytical data collected during the Second Quarter Monitoring Event for Second Baseline Phase for the North and South Fills, pursuant to the PMP. The data was validated for precision, accuracy, representativeness, comparability, and completeness (collectively known as "PARCC") using the criteria specified in the PMP, the Region II data validation guidelines defined below, and the individual analytical methodologies.

Data validation was performed in accordance with the following Region II Standard Operating Procedures (SOPs) and the individual methods listed in Tables B-7 through B-9 of the PMP:

- HW-33, Revision 1 – USEPA CLP SOW for Organic Analysis of Low/Medium Concentration of VOCs SOM01.2, August 2007
- HW-34, Revision 1 – USEPA CLP SOW for Organic Analysis of Trace Concentration of VOCs SOM01.2, August 2007
- HW-35, Revision 1 – USEPA CLP SOW for Organic Analysis of Low/Medium Concentration of SVOCs by SOM01.2, August 2007
- HW-36, Revision 1 – USEPA CLP SOW for Organic Analysis of Low/Medium Concentration of Pesticide Organic Compounds SOM01.2, August 2007
- HW-37, Revision 1 – USEPA CLP SOW for Organic Analysis of Low/Medium Concentration of Aroclor Organic Compounds SOM01.2, August 2007
- HW-2, Revision 13 – Validation of Metals for the Contract Laboratory Program (CLP) based on SOW ILM05.3, September 2006
- HW-24, Revision 2 – Validating VOCs by SW-846 Method 8260B, October 2006

Collectively, these documents are referred to as the functional guidelines. The results of the data validation are discussed in detail in the Data Validation Narrative in Appendix A. In general, the PARCC criteria specified in the PMP were achieved for all methods used to analyze the samples collected as part of the Second Quarter Monitoring Event for Second Baseline Phase for the North and South Fills. Any

<sup>2</sup> Golder Associates is an NJDEP certified laboratory (#03027).



deficiencies noted during validation and the qualifiers that were applied to the data are summarized in Table A-2 in Appendix A.

Following data validation, the analytical data and corresponding qualifiers were summarized for each sample point. These qualified results are provided in the Summaries of Validated Data, which are located in Appendix B. In accordance with the SOW, the results were compared to the applicable trigger levels specified in Exhibits A, B, and C of the SOW (Tables 3 and 4 of this report), which are discussed in Section 2.5 of this report.

The data validation results indicate that all of the data are acceptable, with a few exceptions as further discussed in Appendix A. In some cases, the data required qualification due to quality control criteria not being achieved. However, in general, the data are deemed usable for the objectives of the O&M monitoring program.

## 2.4 Water Quality Monitoring Results

A summary of analyte detections for the samples collected at the Site during the Second Quarter Monitoring Event for Second Baseline Phase for the North and South Fills is included in Appendix B. The summary tables for each sample point, which are grouped by analytical method and sample matrix, contain the following information:

- Detected Constituents – List of constituents that were detected at any monitoring point, along with the reported concentration;
- Qualifiers – The qualifiers that were applied to the results either by the laboratory or by Golder Associates following data validation;
- Units – The units that are associated with each analytical result; and
- Trigger Level – The levels that the analytical results were compared to, which are located in Exhibits A, B, and C of the SOW. Exceedances of the Trigger levels are shown by boldface type and underlining.

The table header contains the following information: sample identification number and date of sample collection.

### 2.4.1 Exceedances of Well Trigger Levels<sup>3</sup>

The three specific trigger events, i.e., the Type A Trigger, the Type B Trigger, and the Type C Trigger, are designed to identify when contaminants are migrating out of one or more Fill areas at levels which would necessitate activation of the groundwater extraction system at one or more Fill areas (or portions thereof as approved in writing by USEPA). The Type A and Type C Triggers are described in this section. The Type B Trigger is explained in Section 2.5.2 below.

<sup>3</sup> The portions of Sections 2.5.1 and 2.5.2 that explain the trigger types were taken verbatim from Appendix B of the SOW.



A "Type A Trigger" would occur, for the purposes of the SOW, when any analysis of any sample taken from any groundwater monitoring well at the Site indicates that the concentration of any Well Chemical is greater than or equal to two times the Well Trigger Level set for that Well Chemical. Groundwater extraction shall be initiated at all groundwater extraction wells associated with the groundwater extraction zones responsible for the exceedance within a USEPA-approved timeframe. Another sample may be obtained, which can be analyzed and the results reported to USEPA, within the aforementioned USEPA-approved timeframe, for consideration in determining the need for initiation of such groundwater extraction.

A "Type C Trigger" would occur, for the purposes of the SOW, whenever the concentration of any Well Chemical in groundwater, averaged over the groundwater monitoring well in any groundwater extraction zone, is equal to or greater than its respective Well Trigger Level.

There were no Type A or Type C Trigger Level exceedances during the Second Quarter Monitoring Event for Second Baseline Phase for the North and South Fills, as presented on Figure 1 and in tabular format in Appendix B.

#### **2.4.2 Exceedances of River Trigger Levels**

A "Type B Trigger" would occur, for the purposes of the SOW, whenever a) the concentration of a River Chemical at any station located within one-quarter (1/4) mile downstream from any Fill area or portion thereof ("the downstream location") in either the Whippany River or the Rockaway River exceeds the River Trigger Level for that Chemical and either of the following exists: b.1) the concentration of the River Chemical at that upstream location is less than the River Trigger Level; or b.2) the concentration of a River Chemical at both the upstream and downstream locations are above the River Trigger Level but the downstream concentration is statistically greater than the upstream concentration. The statistical analysis to be used to determine if "the downstream concentration is statistically greater than the upstream concentration" stated in b.2), above, shall be a methodology selected by USEPA (or a methodology proposed by the Settling Defendants and consistent with 40 CFR 264.90 through 264.99, approved by EPA).

There were no Type B Trigger Level exceedances during the Second Quarter Monitoring Event for Second Baseline Phase for the North and South Fills, as presented on Figure 1 and in tabular format in Appendix B.



### **3.0 CONCLUSIONS**

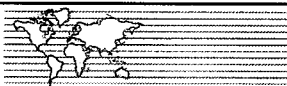
Sampling, analysis and validation of groundwater and surface water samples from the Sharkey Landfill Site was performed in accordance with the O&M Plan and the SOW, Appendix B of the Consent Decree. The primary purpose of the Second Baseline Phase is to provide the data necessary to assess the effectiveness of the RA O&M phase at the Site. Sampling results from the Second Quarter Monitoring Event for Second Baseline Phase for the North and South Fills indicate that there do not appear to be elevated levels of the Site constituents of concern that would require further operation of the GWES at the North and South Fills.

#### **3.1 Data Quality and Acceptability**

The data validation performed on the sample results from the Second Quarter Monitoring Event for Second Baseline Phase for the North and South Fills indicates that all of the data, with the exception of a few parameters, are acceptable. However, some sample results required qualification due to non-conformance to the requirements of the method or the functional guidelines, as noted in Appendix A. All sample results that required qualification was performed in accordance with the functional guidelines and are summarized in Table A-2.

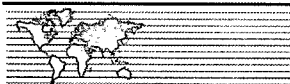
#### **3.2 Water Quality**

There were no exceedances of the Well Trigger Levels or River Trigger Levels at the Site in the Second Quarter Monitoring Event for Second Baseline Phase for the North and South Fills. In summary, these sampling results indicate that there do not appear to be elevated levels of the Site constituents of concern in the North and South Fills.



#### 4.0 REFERENCES

- Golder Associates Inc., February 1996. "Preliminary (35%) Design Report, Sharkey Landfill, Morris County, New Jersey."
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**TABLE 1**  
**SUMMARY OF FIELD PARAMETER STABILIZATION DATA**  
**SECOND BASELINE PHASE FOR THE NORTH AND SOUTH FILLS**  
**SHARKEY LANDFILL**  
**MORRIS COUNTY, NEW JERSEY**

Field Parameters									
Well ID	Date Sampled	Temperature [°C]	pH [std]	Specific Conductance [mS/cm]	Turbidity [ntu]	Dissolved Oxygen [mg/L]	Redox Potential [mV]	Depth to Water [ft-btoc]	Notes
M-1	2/27/2015	12.42	6.72	4.94	24.7	0.00	-125	30.77	MS/MSD  FD Collected
M-2 <sup>1</sup>	2/27/2015	10.41	6.32	1.010	21.1	0.00	84	15.31	
M-3	2/27/2015	10.27	6.71	0.914	8.0	0.00	-74	13.70	
M-4	2/26/2015	6.50	8.40	8.73	11.3	8.27	29	24.88	
M-5	2/26/2015	9.36	6.72	1.71	18.9	0.00	-94	31.35	
M-6	2/27/2015	12.00	6.39	2.36	2.6	0.00	-116	18.20	
M-8	2/26/2015	10.13	6.38	0.537	35.1	0.00	-37	13.95	
M-9A	2/27/2015	10.39	6.34	1.09	9.1	0.00	-95	9.16	
M-10	2/27/2015	11.81	6.92	0.594	17.6	0.00	-139	13.45	
M-11	2/25/2015	13.99	7.55	4.51	1.8	0.00	-148	20.10	
M-12	2/26/2015	7.33	8.05	0.093	7.7	7.10	120	16.38	
M-13	2/25/2015	14.19	7.05	1.69	20.5	0.00	-183	16.02	
M-14	2/25/2015	13.14	7.29	1.23	0.2	0.00	-102	16.02	
M-15	2/25/2015	11.76	6.73	0.906	10.9	0.00	-170	17.65	
M-16	2/25/2015	11.41	7.47	1.60	6.2	0.00	-105	6.03	
M-27	2/27/2015	12.61	6.75	3.85	9.1	0.00	-181	17.18	
Surface Water Point	Date Sampled	Temperature [°C]	pH [std]	Specific Conductance [mS/cm]	Turbidity [ntu]	Dissolved Oxygen [mg/L]	Redox Potential [mV]	Sample Depth [in-bws]	Notes
W1 (U)	3/30/2015	6.01	7.26	0.844	2.4	4.07	208	0 - 12	FD Collected
W2 (U)	3/30/2015	5.61	7.31	0.863	3.9	4.09	214	0 - 12	
W3 (D)	3/30/2015	5.90	7.30	0.862	4.1	4.08	227	0 - 12	
W4 (U)	3/30/2015	4.51	7.06	0.886	5.8	3.21	172	0 - 12	
W5 (U/D)	3/30/2015	5.26	7.10	0.864	5.4	3.49	195	0 - 12	
W6 (D)	3/30/2015	4.96	6.74	0.893	4.4	7.23	180	0 - 12	
R1 (U)	3/30/2015	4.23	7.01	0.515	4.7	4.26	207	0 - 12	
R2 (U)	3/30/2015	4.03	7.02	0.523	6.4	3.57	204	0 - 12	
R3 (D)	3/30/2015	4.14	7.00	0.357	5.8	3.21	183	0 - 12	
R4 (D)	3/30/2015	5.91	6.86	0.520	4.3	4.55	159	0 - 12	MS/MSD

**Abbreviations**

°C: degrees Celsius

std: standard units

mS/cm: milliSiemens per centimeter

ntu: nephelometric turbidity units

mg/L: milligrams per liter

mV: millivolts

ft-btoc: feet below top of casing

in-bws: inches below water surface

FD: field duplicate

MS/MSD: matrix spike/matrix spike duplicate

Created by: LLB\_4/2/15

Checked by: SNK\_4/2/2015

**Notes**

1.) M-2 was purged dry and sampled on 2/27/15. Sufficient sample volume was not collected from M-2 on 2/27/15 for pesticides, polychlorinated biphenyls (PCBs), and cyanide analyses. M-2 was purged dry on 4/15/2015 and sampled on 4/16/2015 for pesticides, PCBs, and cyanide analyses. Field parameter measurements were not collected on 4/16/2015 due to lack of sample volume.



**TABLE 2**  
**SOW TARGET COMPOUND LIST / TARGET ANALYTE LIST**  
**SHARKEY LANDFILL**  
**MORRIS COUNTY, NEW JERSEY**

<b><u>Volatiles</u></b>		
Chloromethane,	2-Butanone,	4-Methyl-2-pentanone,
Bromomethane,	1,1,1-Trichloroethane,	2-Hexanone,
Vinyl chloride,	Carbon tetrachloride,	Tetrachloroethene,
Chloroethane,	Bromodichloromethane,	Toluene,
Methylene chloride,	1,2-Dichloropropane,	1,1,2,2-Tetrachloroethane,
Acetone,	cis-1,3-Dichloropropene,	Chlorobenzene,
Carbon disulfide,	1,4-Dioxane	Ethylbenzene,
1,1-Dichloroethene,	Trichloroethene,	Styrene,
1,1-Dichloroethane,	Dibromochloromethane,	Xylenes (total),
1,2-Dichloroethene (total),	1,1,2-Trichloroethane,	1,3-Dichlorobenzene,
Chloroform,	Benzene,	1,4-Dichlorobenzene,
1,2-Dichloroethane,	trans-1,3-Dichloropropene,	1,2-Dichlorobenzene,
	Bromoform,	1,2,4-Trichlorobenzene
<b><u>Semi-Volatiles</u></b>		
Phenol,	2,4,6-Trichlorophenol,	Hexachlorobenzene,
bis(2-Chloroethyl)ether,	2,4,5-Trichlorophenol,	Pentachlorophenol,
2-Chlorophenol,	2-Chloronaphthalene,	Phenanthrene,
2-Methylphenol,	2-Nitroaniline,	Anthracene,
2,2'-oxybis(1-Chloropropane),	Dimethylphthalate,	Carbazole,
4-Methylphenol,	Acenaphthylene,	Di-n-butylphthalate,
N-Nitroso-di-n-propylamine,	2,6-Dinitrotoluene,	Fluoranthene,
Hexachloroethane,	3-Nitroaniline,	Pyrene,
Nitrobenzene,	Acenaphthene,	Butylbenzylphthalate,
Isophorone,	2,4-Dinitrophenol,	3,3'-Dichlorobenzidine,
2-Nitrophenol,	4-Nitrophenol,	Benzo(a)anthracene,
2,4-Dimethylphenol,	Dibenzofuran,	Chrysene,
bis(2-Chloroethoxy)methane,	2,4-Dinitrotoluene,	bis(2-Ethylhexyl)phthalate,
2,4-Dichlorophenol,	Diethylphthalate,	Di-n-octylphthalate,
Naphthalene,	4-Chlorophenyl-phenyl ether,	Benzo(b)fluoranthene,
4-Chloroaniline,	Fluorene,	Benzo(k)fluoranthene,
Hexachlorobutadiene,	4-Nitroaniline,	Benzo(a)pyrene,
4-Chloro-3-methylphenol,	4,6-Dinitro-2-methylphenol,	Indeno(1,2,3-cd)pyrene,
2-Methylnaphthalene,	N-Nitrosodiphenylamine,	Dibenz(a,h)anthracene,
Hexachlorocyclopentadiene,	4-Bromophenyl-phenyl ether,	Benzo(g,h,i)perylene
<b><u>Pesticides/Aroclors</u></b>		
alpha-BHC,	Endrin,	gamma-Chlordane,
beta-BHC,	Endosulfan sulfate,	Toxaphene,
delta-BHC,	4,4'-DDD,	Aroclor-1016,
delta-BHC (Lindane),	Endosulfan II,	Aroclor-1221,
Heptachlor,	4,4'-DDT,	Aroclor-1232,
Aldrin,	Methoxychlor,	Aroclor-1242,
Heptachlor epoxide,	Endrin ketone,	Aroclor-1248,
Endosulfan I,	Endrin aldehyde,	Aroclor-1254,
Dieldrin,	alpha-Chlordane,	Aroclor-1260
4,4'-DDE,		
<b><u>Analytes</u></b>		
Aluminum,	Cobalt,	Potassium,
Antimony,	Copper,	Selenium,
Arsenic,	Iron,	Silver,
Barium,	Lead,	Sodium,
Beryllium,	Magnesium,	Thallium,
Cadmium,	Manganese,	Vanadium,
Calcium,	Mercury,	Zinc,
Chromium,	Nickel,	Cyanide

Source: Taken from the Sharkey Landfill SOW, Exhibit A.

**TABLE 3**  
**SOW WELL CHEMICALS AND WELL TRIGGER LEVELS**  
**SHARKEY LANDFILL**  
**MORRIS COUNTY, NEW JERSEY**

Well Chemical	Well Trigger Level (ppb)
Total VOCs	1000
Benzene: Rockaway River	50
Whippany River	100
bis(2-Ethylhexyl)phthalate	100-299 <sup>(a)</sup> 300 <sup>(a)</sup>
N-Nitrosodiphenylamine	10
Arsenic	50
Cadmium	10
Chromium	50
Lead	50
Mercury	2
Silver	50
Selenium	10
Barium	1000

VOCs: Volatile Organic Compounds

ppb: parts per billion

<sup>(a)</sup> If concentrations of bis(2-Ethylhexyl)phthalate between 100 and 299 are detected in any GWM well, an evaluation program to determine the impact of bis(2-Ethylhexyl)phthalate on the associated rivers will be initiated. Any concentrations greater than or equal to 300 ppb shall cause the initiation of the GWE program as outlined in Section E.13 of the SOW.

Source: Taken from the Sharkey Landfill SOW, Exhibit B.

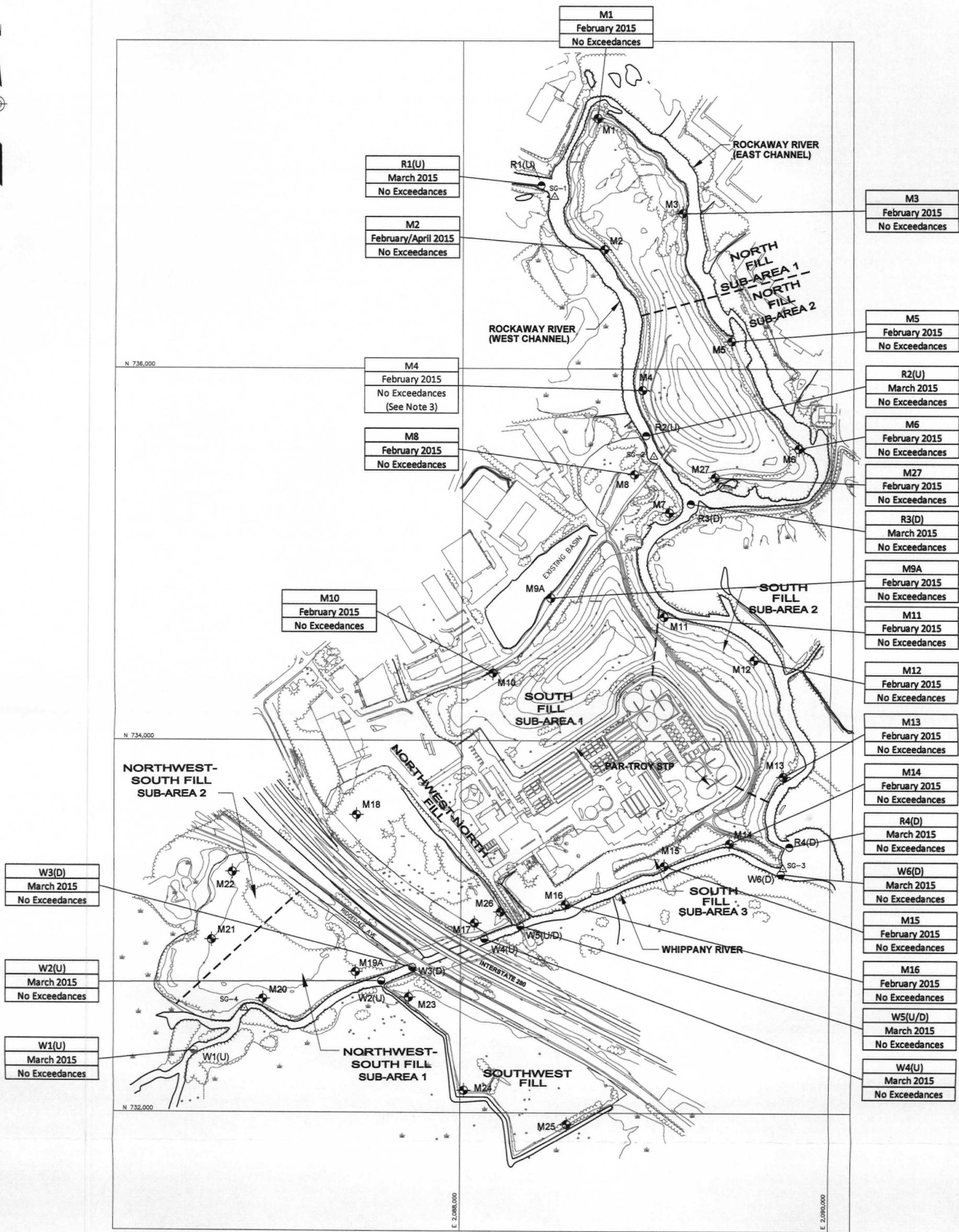
**TABLE 4**  
**SOW RIVER CHEMICALS AND RIVER TRIGGER LEVELS**  
**SHARKEY LANDFILL**  
**MORRIS COUNTY, NEW JERSEY**

River Chemicals	River Trigger (ppb)	PQL* (ppb)
Acrolein	320	50
Acrylonitrile	0.059	8
Benzene	1.2	1
Bromoform	4.3	1
Chlorobenzene	680	1
Chlorodibromomethane	0.41	1
2-Chloroethylvinyl ether	-	5
Chloroform	5.7	1
Carbon tetrachloride	0.25	1
Dichlorobromomethane	0.27	1
1,2-Dichlorobenzene	2700	1
1,3-Dichlorobenzene	400	1
1,4-Dichlorobenzene	400	1
1,2-Dichloroethane	0.38	1
1,1-Dichloroethane	-	1
1,1-Dichloroethylene	0.57	1
1,2-Dichloropropane	0.52	1
1,3-Dichloropropylene	10	5
Ethylbenzene	3100	1
Methyl bromide	48	1
Methyl chloride	5.7	1
Methylene chloride	4.7	2
1,2-trans-Dichloroethylene	700	1
1,1,2,2-Tetrachloroethane	1.7	1
Tetrachloroethylene (PCE)	0.8	1
Toluene	6800	1
1,1,1-Trichloroethane	3100	1
1,1,2-Trichloroethane	6	1
Trichloroethylene (TCE)	2.7	1
Vinyl chloride	2	1






ppb: parts per billion

PQL: Practical Quantitation Limit

Source: Taken from the Sharkey Landfill SOW, Exhibit C.



#### LEGEND

- SG-4  STAFF GAUGE LOCATION
- M14  GROUNDWATER MONITORING WELL DESIGNATION AND APPROXIMATE LOCATION
- R1(U)  SURFACE WATER SAMPLING STATION IN THE ROCKAWAY RIVER
- W1(U)  SURFACE WATER SAMPLING STATION IN THE WHIPPANY RIVER
-  LANDFILL SUB-AREA BOUNDARY

#### NOTES


- 1.) (U) - UPSTREAM SAMPLING STATION (WITH REGARD TO NEAREST FILL AREA)  
(D) - DOWNSTREAM SAMPLING STATION (WITH REGARD TO NEAREST FILL AREA)
- 2.) MONITORING WELL LOCATIONS ARE BASED UPON THE REMEDIAL DESIGN.
- 3.) THE RESULT FOR TOTAL VOCs IS HIGHER THAN THE WELL TRIGGER LEVEL, HOWEVER IS NOT CONSIDERED AN EXCEEDANCE AS THE TOTAL VOCs IN M-4 DID NOT EXCEED TWICE THE WELL TRIGGER LEVEL.

#### REFERENCES

- 1.) TOPOGRAPHIC DATA AT THE FIVE FILLS PROVIDED BY PROMAPS, MOORESTOWN, NEW JERSEY VIA CADD FILE TITLED 82598, DATED JANUARY 26, 1999, BASED ON AERIAL PHOTOGRAPHY DATED JANUARY 4, 1999. TOPOGRAPHIC DATA OUTSIDE OF THE FIVE FILLS PROVIDED BY ATLANTIS AERIAL SURVEY COMPANY, INC., BUDD LAKE, NEW JERSEY DATED OCTOBER 4, 1994, BASED ON AERIAL PHOTOGRAPHY DATED APRIL 1, 1994. TOPOGRAPHIC DATA TIE-IN PREPARED BY PROMAPS.
- 2.) TOPOGRAPHIC MAP DOES NOT REPRESENT REMEDIAL ACTION CONSTRUCTION IMPROVEMENTS.

250 0 250 500  
scale feet

REV	DATE	DES	REVISION DESCRIPTION	CADD	CHK	RW
PROJECT						
SHARKEY LANDFILL SUPERFUND SITE MORRIS COUNTY, NEW JERSEY						
TITLE						
GROUNDWATER AND SURFACE WATER EXCEEDANCES OF THE SOW TRIGGER LEVELS - 2nd QTR OF SECOND BASELINE						
PROJECT No. 943-6198 FILE No. 94361985002						
DESIGN	RMW	06/17/15	SCALE	AS SHOWN	REV.	0
CADD	AM	06/17/15				
CHECK	PLL	06/17/15				
REVIEW	MEC	06/17/15				
FIGURE 1						

 **Golden Associates**  
Mt. Laurel, New Jersey

**APPENDIX A**  
**DATA VALIDATION NARRATIVE**  
**SECOND QUARTER OF THE SECOND BASELINE PHASE - NORTH AND SOUTH FILLS**

**DATA VALIDATION NARRATIVE  
SECOND QUARTER OF THE SECOND BASELINE PHASE  
SHARKEY LANDFILL**

This report presents the findings of the data validation performed on the analyses of shallow groundwater and surface water samples collected for the Second Quarter of the Second Baseline Phase, North and South Fills. The monitoring event was conducted at the Sharkey Landfill Superfund Site (Site) in accordance with the Performance Monitoring Plan for Remedial Action (PMP, December 2005) for the Site. Samples for the event were collected February 27, 2015 through April 16, 2015. The chemical data for samples collected at the Site were validated to identify quality issues which could affect the use of the data for decision making purposes.

A total of seventeen (17) groundwater and ten (10) surface water samples, as well as two (2) field duplicates, two (2) matrix spike / matrix spike duplicates (MS/MSDs), one (1) rinsate blank, and four (4) trip blanks for Quality Control (QC) purposes, were collected for chemical analysis during the monitoring event. The groundwater samples were analyzed for the TCL Chemicals<sup>1</sup> of Volatile Organic Compounds (VOCs), Semivolatile Organic Compounds (SVOCs), Pesticides, Polychlorinated Biphenyls (PCBs), and Metals, including the Well Chemicals (WC) List<sup>2</sup>, as listed in Tables 2 and 3, respectively, of the main report. The surface water samples were analyzed for the TCL Chemicals of VOCs, SVOCs, Pesticides/PCBs, and Metals, including the River Chemicals (RC) List<sup>3</sup>, as listed in Tables 2 and 4, respectively, of the main report. Field duplicates were analyzed for the same parameters as their parent sample and the trip blank samples were analyzed for VOCs only. CompuChem of Cary, North Carolina performed all chemical analyses following USEPA method guidelines:

- VOCs, SVOCs, Pesticides, and PCBs following USEPA Contract Laboratory Program (CLP) Statement of Work (SOW) for Multi-Media, Multi-Concentration Organics Analysis SOM01.2, October 2006;
- RC List VOCs following USEPA CLP SOW for Low Concentration Organic Analysis SOM01.2 Trace, October 2006;
- RC List VOCs (acrolein, acrylonitrile, and 2-chloroethyl vinyl ether only) following USEPA SW846 Method 8260B Volatile Organic Compounds by Gas Chromatography/Mass Spectrometry (GC/MS) (December, 1996); and,
- Metals following USEPA CLP SOW for Multi-Media, Multi-Concentration Inorganics Analysis ILM05.4, December 2006.

Information regarding the sample point identifications, analytical parameters, QC samples, sampling dates, and contract laboratory sample delivery group (SDG) designations are summarized in Table A-1.

<sup>1</sup> Exhibit A of the Site SOW identifies the TCL Chemicals.

<sup>2</sup> Exhibit B of the Site SOW identifies the Well Chemicals.

<sup>3</sup> Exhibit C of the Site SOW identifies the River Chemicals.

The laboratory data were validated for precision, accuracy, representativeness, comparability, and completeness (PARCCs) and to verify data usability. Validation was performed on 100% of the data submitted by the Laboratory. Data validation was performed in accordance with the following documents:

- USEPA Region II Standard Operating Procedure (SOP) No. HW-33, Revision 1 – USEPA Contract Laboratory Program Statement of Work for Organic Analysis of Low/Medium Concentration of Volatile Organic Compounds SOM01.2 Data Validation, August 2007;
- USEPA Region II SOP No. HW-34, Revision 1 USEPA Contract Laboratory Program Statement of Work for Organic Analysis of Trace Concentration of Volatile Organic Compounds SOM01.2 Data Validation, August 2007;
- USEPA Region II SOP No. HW-24, Revision 1, Validating Volatile Organic Compounds by SW-846 Method 8260B, June 1999;
- USEPA Region II SOP No. HW-35, Revision 1, USEPA Contract Laboratory Program Statement of Work for Organic Analysis of Low/Medium Concentration Semivolatile Organic Compounds SOM01.2, August 2007;
- USEPA Region II SOP No. HW-36, Revision 1, USEPA Contract Laboratory Program Statement of Work for Organic Analysis of Low/Medium Concentration of Pesticide Organic Compounds SOM01.2, August 2007;
- USEPA Region II SOP No. HW-37, Revision 1, USEPA Contract Laboratory Program Statement of Work for Organic Analysis of Low/Medium Concentration of Aroclor Organic Compounds SOM01.2, August 2007; and,
- USEPA Region II SOP No. HW-2, Revision 13 – Validation of Metals for the Contract Laboratory Program, September 2006.

In general, chemical results for the samples collected at the Site were qualified on the basis of outlying precision or accuracy parameters, or on the basis of professional judgment. The following definitions provide brief explanations of the qualifiers which may have been assigned to data during the data validation process.

- J The analyte was reported above the method detection limit; however, the associated numerical value is the approximate concentration of the analyte in the sample.
- U The analyte was analyzed for, but was not detected above the method detection limit.
- UJ The analyte was not detected above the method detection limit. The associated quality control measurements indicate the quantitation limit is approximate.
- R The sample result was rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria.

In general, the data generated during the monitoring event met the QC criteria established in the respective USEPA methods and Region II Data Validation Standard Operating Procedures (SOPs). The following bulleted items highlight qualifications to specific parameters. Although these qualifications were applied to some of the samples collected at the Site, the qualifications may not have been required or

applied to all samples collected. Table A-2 summarizes all qualifications applied to the data, with applicable qualifier codes.

- Detected groundwater results for 1,4-dioxane were qualified as estimated (J) and non-detect groundwater results for 1,4-dioxane were rejected (R) when initial calibration relative response factors (RRFs) were below QC criteria.
- Certain non-detect groundwater and surface water SVOC and pesticide results were qualified as estimated (UJ) when the continuing calibration verification (CCV) percent differences were outside QC criteria.
- Surface water samples FDSW\_033015 and R4 (D) results for chloroform were qualified as estimated (J) when surrogate recoveries were above QC criteria.
- Certain groundwater results for pesticides were qualified as estimated (J) or qualified as non-detect (U) at the RL when the percent difference between analysis columns was above QC criteria, depending on the magnitude of the difference between the columns.
- Beta-BHC results for groundwater samples M-1, M-4, and M-11 were rejected (R) when the percent difference between columns was greater than 200% and the sample result was greater than the RL.
- Certain groundwater results for toluene were qualified as non-detect (U) at the reporting limit (RL) due to rinsate blank contamination.
- Certain surface water results for copper, mercury, and zinc were qualified as non-detect (U) at the RL due to preparation blank contamination.
- Certain surface water results for potassium and mercury were qualified as non-detect (U) at the RL due to continuing calibration blank contamination.

Based on the data validation, the analytical data for samples collected at the Site were determined to be acceptable (including estimated data) for their intended use, with the exception of data qualified as R (rejected). Generally, acceptable levels of accuracy and precision were achieved for the data, based on laboratory control sample (LCS), MS/MSD, field duplicate and surrogate recoveries. In addition, the data completeness (i.e., the ratio of the amount of valid data obtained to the amount expected, including estimated (J/UJ) data) was 99.8%, which meets the completeness goal specified in the PMP for the Site.



**TABLE A-1  
SAMPLE POINT IDENTIFICATIONS  
SECOND BASELINE PHASE  
SHARKEY LANDFILL**

Lab SDG	Field ID	Matrix	Sample Date	WC VOCs <sup>1</sup>	RC VOCs <sup>2</sup>	SVOCs <sup>1</sup>	Pesticides /PCBs <sup>1</sup>	Metals <sup>3</sup>	MS/MSD	Duplicate
1502055	M-11	GW	2/25/2015	x		x	x	x		
1502055	M-13	GW	2/25/2015	x		x	x	x		
1502055	M-14	GW	2/25/2015	x		x	x	x		
1502055	M-15	GW	2/25/2015	x		x	x	x		
1502055	M-16	GW	2/25/2015	x		x	x	x		
1502055	M-12	GW	2/26/2015	x		x	x	x		
1502055	M-4	GW	2/26/2015	x		x	x	x		
1502055	M-5	GW	2/26/2015	x		x	x	x		
1502055	M-8	GW	2/26/2015	x		x	x	x	x	
1502055	FDGW-022715	GW	2/27/2015	x		x	x	x		x (M-10)
1502055	M-1	GW	2/27/2015	x		x	x	x		
1502055	M-10	GW	2/27/2015	x		x	x	x		
1502055, 1504050	M-2	GW	2/27/2015, 4/16/2015	x		x	x	x		
1502055	M-27	GW	2/27/2015	x		x	x	x		
1502055	M-3	GW	2/27/2015	x		x	x	x		
1502055	M-6	GW	2/27/2015	x		x	x	x		
1502055	M-9A	GW	2/27/2015	x		x	x	x		
1503098, 1503099	FDSW_033015	SW	3/30/2015		x	x	x	x		x (W6 (D))
1503098, 1503099	R1 (U)	SW	3/30/2015		x	x	x	x		
1503098, 1503099	R2 (U)	SW	3/30/2015		x	x	x	x		
1503098, 1503099	R3 (D)	SW	3/30/2015		x	x	x	x		
1503098, 1503099	R4 (D)	SW	3/30/2015		x	x	x	x	x	
1503098, 1503099	W1 (U)	SW	3/30/2015		x	x	x	x		
1503098, 1503099	W2 (U)	SW	3/30/2015		x	x	x	x		
1503098, 1503099	W3 (D)	SW	3/30/2015		x	x	x	x		
1503098, 1503099	W4 (U)	SW	3/30/2015		x	x	x	x		
1503098, 1503099	W5 (U/D)	SW	3/30/2015		x	x	x	x		
1503098, 1503099	W6 (D)	SW	3/30/2015		x	x	x	x		
<b>Field Blanks</b>										
1502055	TBGW-022515	TB	2/25/2015	x						
1502055	RBGW-022615	RB	2/26/2015	x		x	x	x		
1502055	TBGW-022615	TB	2/26/2015	x						
1502055	TBGW-022715	TB	2/27/2015	x						
1503098, 1503099	TBSW_033015	TB	3/30/2015		x					

**Notes:**

All samples to be analyzed for chemical analysis were shipped to CompuChem of Cary, North Carolina.

<sup>1</sup>VOCs, SVOCs, and Pesticides/PCBs following USEPA Contract Laboratory Program (CLP) Statement of Work (SOW) for Multi-Media, Multi-Concentration Organics Analysis SOM01.2, October 2006.

<sup>2</sup>RC list VOCs following USEPA CLP SOW for Low Concentration Organic Analysis SOM01.2 (trace) and USEPA SW846 Method 8260B Volatile Organic Compounds by Gas Chromatography/Mass Spectrometry (GC/MS) (December 1996) for acrolein, acrylonitrile, and 2-chloroethyl vinyl ether only.

<sup>3</sup>Metals including cyanide by USEPA CLP SOW for Multi-Media, Multi-Concentration Inorganics Analysis ILM05.4, December 2006.

**Abbreviations:**

GW = Ground Water  
MS/MSD = Matrix Spike/ Matrix Spike Duplicate  
PCBs = Polychlorinated Biphenyls  
RB = Rinse Blank  
RC = River Chemicals  
SDG = Sample Delivery Group  
SVOCs = Semivolatile Organic Compounds  
SW = Surface Water  
TB = Trip Blank  
VOCs = Volatile Organic Compounds  
WC = Well Chemicals

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**TABLE A-2  
SUMMARY OF DATA QUALIFICATIONS  
SECOND BASELINE PHASE  
SHARKEY LANDFILL**

SDG	Field ID	Matrix	Analysis	Analyte	New Result	New RL	Qual	Golder Qual Code	Comments
1502055	M-5	GW	VOCs	Toluene	5	-	U	RB	Rinsate blank contamination
1502055	FDGW-022715	GW	VOCs	1,4-Dioxane	-	-	R	IRF	Initial calibration RRF outside QC criteria
1502055	M-1	GW	VOCs	1,4-Dioxane	-	-	J	IRF	Initial calibration RRF outside QC criteria
1502055	M-10	GW	VOCs	1,4-Dioxane	-	-	R	IRF	Initial calibration RRF outside QC criteria
1502055	M-11	GW	VOCs	1,4-Dioxane	-	-	J	IRF	Initial calibration RRF outside QC criteria
1502055	M-12	GW	VOCs	1,4-Dioxane	-	-	R	IRF	Initial calibration RRF outside QC criteria
1502055	M-13	GW	VOCs	1,4-Dioxane	-	-	J	IRF	Initial calibration RRF outside QC criteria
1502055	M-14	GW	VOCs	1,4-Dioxane	-	-	J	IRF	Initial calibration RRF outside QC criteria
1502055	M-15	GW	VOCs	1,4-Dioxane	-	-	R	IRF	Initial calibration RRF outside QC criteria
1502055	M-16	GW	VOCs	1,4-Dioxane	-	-	R	IRF	Initial calibration RRF outside QC criteria
1502055	M-2	GW	VOCs	1,4-Dioxane	-	-	R	IRF	Initial calibration RRF outside QC criteria
1502055	M-27	GW	VOCs	1,4-Dioxane	-	-	J	IRF	Initial calibration RRF outside QC criteria
1502055	M-3	GW	VOCs	1,4-Dioxane	-	-	R	IRF	Initial calibration RRF outside QC criteria
1502055	M-4	GW	VOCs	1,4-Dioxane	-	-	J	IRF	Initial calibration RRF outside QC criteria
1502055	M-5	GW	VOCs	1,4-Dioxane	-	-	J	IRF	Initial calibration RRF outside QC criteria
1502055	M-6	GW	VOCs	1,4-Dioxane	-	-	J	IRF	Initial calibration RRF outside QC criteria
1502055	M-8	GW	VOCs	1,4-Dioxane	-	-	R	IRF	Initial calibration RRF outside QC criteria
1502055	M-9A	GW	VOCs	1,4-Dioxane	-	-	R	IRF	Initial calibration RRF outside QC criteria
1502055	M-12	GW	SVOCs	Di-n-octylphthalate	-	-	UJ	CRD	CCV %D outside QC criteria
1502055	M-12	GW	SVOCs	Indeno(1,2,3-cd)Pyrene	-	-	UJ	CRD	CCV %D outside QC criteria
1502055	M-12	GW	SVOCs	Pentachlorophenol	-	-	UJ	CRD	CCV %D outside QC criteria
1502055	M-13	GW	SVOCs	Di-n-octylphthalate	-	-	UJ	CRD	CCV %D outside QC criteria
1502055	M-13	GW	SVOCs	Indeno(1,2,3-cd)Pyrene	-	-	UJ	CRD	CCV %D outside QC criteria
1502055	M-13	GW	SVOCs	Pentachlorophenol	-	-	UJ	CRD	CCV %D outside QC criteria
1502055	M-14	GW	SVOCs	Di-n-octylphthalate	-	-	UJ	CRD	CCV %D outside QC criteria
1502055	M-14	GW	SVOCs	Indeno(1,2,3-cd)Pyrene	-	-	UJ	CRD	CCV %D outside QC criteria
1502055	M-14	GW	SVOCs	Pentachlorophenol	-	-	UJ	CRD	CCV %D outside QC criteria
1502055	M-15	GW	SVOCs	Di-n-octylphthalate	-	-	UJ	CRD	CCV %D outside QC criteria
1502055	M-15	GW	SVOCs	Indeno(1,2,3-cd)Pyrene	-	-	UJ	CRD	CCV %D outside QC criteria
1502055	M-15	GW	SVOCs	Pentachlorophenol	-	-	UJ	CRD	CCV %D outside QC criteria
1502055	M-16	GW	SVOCs	Di-n-octylphthalate	-	-	UJ	CRD	CCV %D outside QC criteria
1502055	M-16	GW	SVOCs	Indeno(1,2,3-cd)Pyrene	-	-	UJ	CRD	CCV %D outside QC criteria
1502055	M-16	GW	SVOCs	Pentachlorophenol	-	-	UJ	CRD	CCV %D outside QC criteria
1502055	M-5	GW	SVOCs	Di-n-octylphthalate	-	-	UJ	CRD	CCV %D outside QC criteria
1502055	M-5	GW	SVOCs	Indeno(1,2,3-cd)Pyrene	-	-	UJ	CRD	CCV %D outside QC criteria
1502055	M-5	GW	SVOCs	Pentachlorophenol	-	-	UJ	CRD	CCV %D outside QC criteria
1502055	M-8	GW	SVOCs	Di-n-octylphthalate	-	-	UJ	CRD	CCV %D outside QC criteria
1502055	M-8	GW	SVOCs	Indeno(1,2,3-cd)Pyrene	-	-	UJ	CRD	CCV %D outside QC criteria
1502055	M-8	GW	SVOCs	Pentachlorophenol	-	-	UJ	CRD	CCV %D outside QC criteria
1502055	M-11	GW	SVOCs	Pentachlorophenol	-	-	UJ	CRD	CCV %D outside QC criteria
1502055	M-11	GW	SVOCs	Indeno(1,2,3-cd)Pyrene	-	-	UJ	CRD	CCV %D outside QC criteria
1502055	M-11	GW	SVOCs	Di-n-octylphthalate	-	-	UJ	CRD	CCV %D outside QC criteria
1502055	M-4	GW	SVOCs	Pentachlorophenol	-	-	UJ	CRD	CCV %D outside QC criteria
1502055	M-4	GW	SVOCs	Indeno(1,2,3-cd)Pyrene	-	-	UJ	CRD	CCV %D outside QC criteria
1502055	M-4	GW	SVOCs	Di-n-octylphthalate	-	-	UJ	CRD	CCV %D outside QC criteria

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**TABLE A-2**  
**SUMMARY OF DATA QUALIFICATIONS**  
**SECOND BASELINE PHASE**  
**SHARKEY LANDFILL**

SDG	Field ID	Matrix	Analysis	Analyte	New Result	New RL	Qual	Golder Qual Code	Comments
1502055	FDGW-022715	GW	SVOCs	Pentachlorophenol	-	-	UJ	CRD	CCV %D outside QC criteria
1502055	M-1	GW	SVOCs	Pentachlorophenol	-	-	UJ	CRD	CCV %D outside QC criteria
1502055	M-10	GW	SVOCs	Pentachlorophenol	-	-	UJ	CRD	CCV %D outside QC criteria
1502055	M-2	GW	SVOCs	Pentachlorophenol	-	-	UJ	CRD	CCV %D outside QC criteria
1502055	M-27	GW	SVOCs	Pentachlorophenol	-	-	UJ	CRD	CCV %D outside QC criteria
1502055	M-3	GW	SVOCs	Pentachlorophenol	-	-	UJ	CRD	CCV %D outside QC criteria
1502055	M-6	GW	SVOCs	Pentachlorophenol	-	-	UJ	CRD	CCV %D outside QC criteria
1502055	M-9A	GW	SVOCs	Pentachlorophenol	-	-	UJ	CRD	CCV %D outside QC criteria
1502055	M-1	GW	Pest	beta-BHC	-	-	R	PD	%D between columns > 200% and result greater than the CRQL
1502055	M-1	GW	Pest	Endrin	0.098	-	U	PD	%D between columns > 50% and result less than the CRQL
1502055	M-11	GW	Pest	beta-BHC	-	-	R	PD	%D between columns > 200% and result greater than the CRQL
1502055	M-13	GW	Pest	beta-BHC	0.05	-	U	PD	%D between columns > 50% and result less than the CRQL
1502055	M-27	GW	Pest	beta-BHC	0.049	-	U	PD	%D between columns > 50% and result less than the CRQL
1502055	M-3	GW	Pest	beta-BHC	-	-	J	PD	%D between columns > 26-200% and result greater than the CRQL
1502055	M-3	GW	Pest	gamma-BHC	0.05	-	U	PD	%D between columns > 50% and result less than the CRQL
1502055	M-3	GW	Pest	Heptachlor epoxide	-	-	J	PD	%D > 25% and result less than the CRQL
1502055	M-4	GW	Pest	beta-BHC	-	-	R	PD	%D between columns > 200% and result greater than the CRQL
1502055	M-4	GW	Pest	delta-BHC	0.049	-	U	PD	%D between columns > 50% and result less than the CRQL
1502055	M-4	GW	Pest	gamma-BHC	-	-	J	PD	%D > 25% and result less than the CRQL
1502055	M-5	GW	Pest	beta-BHC	0.05	-	U	PD	%D between columns > 50% and result less than the CRQL
1502055	M-6	GW	Pest	beta-BHC	0.049	-	U	PD	%D between columns > 50% and result less than the CRQL
1503098	FDSW_033015	SW	Inorganics	Copper	25	-	U	PB	Preparation blank contamination
1503098	R1 (U)	SW	Inorganics	Copper	25	-	U	PB	Preparation blank contamination
1503098	R2 (U)	SW	Inorganics	Copper	25	-	U	PB	Preparation blank contamination
1503098	R3 (D)	SW	Inorganics	Copper	25	-	U	PB	Preparation blank contamination
1503098	R4 (D)	SW	Inorganics	Copper	25	-	U	PB	Preparation blank contamination
1503098	W1 (U)	SW	Inorganics	Copper	25	-	U	PB	Preparation blank contamination
1503098	W2 (U)	SW	Inorganics	Copper	25	-	U	PB	Preparation blank contamination
1503098	W3 (D)	SW	Inorganics	Copper	25	-	U	PB	Preparation blank contamination
1503098	W4 (U)	SW	Inorganics	Copper	25	-	U	PB	Preparation blank contamination
1503098	W5 (U/D)	SW	Inorganics	Copper	25	-	U	PB	Preparation blank contamination
1503098	W6 (D)	SW	Inorganics	Copper	25	-	U	PB	Preparation blank contamination
1503098	FDSW_033015	SW	Inorganics	Zinc	60	-	U	PB	Preparation blank contamination
1503098	R1 (U)	SW	Inorganics	Zinc	60	-	U	PB	Preparation blank contamination
1503098	R2 (U)	SW	Inorganics	Zinc	60	-	U	PB	Preparation blank contamination
1503098	R3 (D)	SW	Inorganics	Zinc	60	-	U	PB	Preparation blank contamination
1503098	R4 (D)	SW	Inorganics	Zinc	60	-	U	PB	Preparation blank contamination
1503098	W1 (U)	SW	Inorganics	Zinc	60	-	U	PB	Preparation blank contamination
1503098	W2 (U)	SW	Inorganics	Zinc	60	-	U	PB	Preparation blank contamination
1503098	W3 (D)	SW	Inorganics	Zinc	60	-	U	PB	Preparation blank contamination
1503098	W4 (U)	SW	Inorganics	Zinc	60	-	U	PB	Preparation blank contamination
1503098	W5 (U/D)	SW	Inorganics	Zinc	60	-	U	PB	Preparation blank contamination
1503098	W6 (D)	SW	Inorganics	Zinc	60	-	U	PB	Preparation blank contamination
1503098	W3 (D)	SW	Inorganics	Mercury	0.2	-	U	PB	Preparation blank contamination
1503098	FDSW_033015	SW	Inorganics	Potassium	5000	-	U	CBC	Continuing calibration blank contamination

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**TABLE A-2**  
**SUMMARY OF DATA QUALIFICATIONS**  
**SECOND BASELINE PHASE**  
**SHARKEY LANDFILL**

SDG	Field ID	Matrix	Analysis	Analyte	New Result	New RL	Qual	Golder Qual Code	Comments
1503098	R1 (U)	SW	Inorganics	Potassium	5000	-	U	CBC	Continuing calibration blank contamination
1503098	R2 (U)	SW	Inorganics	Potassium	5000	-	U	CBC	Continuing calibration blank contamination
1503098	R3 (D)	SW	Inorganics	Potassium	5000	-	U	CBC	Continuing calibration blank contamination
1503098	R4 (D)	SW	Inorganics	Potassium	5000	-	U	CBC	Continuing calibration blank contamination
1503098	W1 (U)	SW	Inorganics	Potassium	5000	-	U	CBC	Continuing calibration blank contamination
1503098	W2 (U)	SW	Inorganics	Potassium	5000	-	U	CBC	Continuing calibration blank contamination
1503098	W3 (D)	SW	Inorganics	Potassium	5000	-	U	CBC	Continuing calibration blank contamination
1503098	W4 (U)	SW	Inorganics	Potassium	5000	-	U	CBC	Continuing calibration blank contamination
1503098	W5 (U/D)	SW	Inorganics	Potassium	5000	-	U	CBC	Continuing calibration blank contamination
1503098	W6 (D)	SW	Inorganics	Potassium	5000	-	U	CBC	Continuing calibration blank contamination
1503098	R2 (U)	SW	Inorganics	Mercury	0.2	-	U	CBC	Continuing calibration blank contamination
1503098	FDSW_033015	SW	SVOCs	Nitrobenzene	-	-	UJ	CRD	Continuing calibration %D outside QC criteria
1503098	R1 (U)	SW	SVOCs	Nitrobenzene	-	-	UJ	CRD	Continuing calibration %D outside QC criteria
1503098	R2 (U)	SW	SVOCs	Nitrobenzene	-	-	UJ	CRD	Continuing calibration %D outside QC criteria
1503098	R3 (D)	SW	SVOCs	Nitrobenzene	-	-	UJ	CRD	Continuing calibration %D outside QC criteria
1503098	W1 (U)	SW	SVOCs	Nitrobenzene	-	-	UJ	CRD	Continuing calibration %D outside QC criteria
1503098	W2 (U)	SW	SVOCs	Nitrobenzene	-	-	UJ	CRD	Continuing calibration %D outside QC criteria
1503098	W3 (D)	SW	SVOCs	Nitrobenzene	-	-	UJ	CRD	Continuing calibration %D outside QC criteria
1503098	W4 (U)	SW	SVOCs	Nitrobenzene	-	-	UJ	CRD	Continuing calibration %D outside QC criteria
1503098	W5 (U/D)	SW	SVOCs	Nitrobenzene	-	-	UJ	CRD	Continuing calibration %D outside QC criteria
1503098	W6 (D)	SW	SVOCs	Nitrobenzene	-	-	UJ	CRD	Continuing calibration %D outside QC criteria
1503098	FDSW_033015	SW	Pest	alpha-BHC	-	-	UJ	CRD	Calibration verification %D outside QC criteria
1503098	FDSW_033016	SW	Pest	beta-BHC	-	-	UJ	CRD	Calibration verification %D outside QC criteria
1503098	FDSW_033017	SW	Pest	gamma-BHC	-	-	UJ	CRD	Calibration verification %D outside QC criteria
1503098	FDSW_033018	SW	Pest	Endrin	-	-	UJ	CRD	Calibration verification %D outside QC criteria
1503098	FDSW_033019	SW	Pest	4,4'-DDT	-	-	UJ	CRD	Calibration verification %D outside QC criteria
1503098	FDSW_033020	SW	Pest	Methoxychlor	-	-	UJ	CRD	Calibration verification %D outside QC criteria
1503098	R1 (U)	SW	Pest	alpha-BHC	-	-	UJ	CRD	Calibration verification %D outside QC criteria
1503098	R1 (U)	SW	Pest	beta-BHC	-	-	UJ	CRD	Calibration verification %D outside QC criteria
1503098	R1 (U)	SW	Pest	gamma-BHC	-	-	UJ	CRD	Calibration verification %D outside QC criteria
1503098	R1 (U)	SW	Pest	Endrin	-	-	UJ	CRD	Calibration verification %D outside QC criteria
1503098	R1 (U)	SW	Pest	4,4'-DDT	-	-	UJ	CRD	Calibration verification %D outside QC criteria
1503098	R1 (U)	SW	Pest	Methoxychlor	-	-	UJ	CRD	Calibration verification %D outside QC criteria
1503098	R2 (U)	SW	Pest	alpha-BHC	-	-	UJ	CRD	Calibration verification %D outside QC criteria
1503098	R2 (U)	SW	Pest	beta-BHC	-	-	UJ	CRD	Calibration verification %D outside QC criteria
1503098	R2 (U)	SW	Pest	gamma-BHC	-	-	UJ	CRD	Calibration verification %D outside QC criteria
1503098	R2 (U)	SW	Pest	Endrin	-	-	UJ	CRD	Calibration verification %D outside QC criteria
1503098	R2 (U)	SW	Pest	4,4'-DDT	-	-	UJ	CRD	Calibration verification %D outside QC criteria
1503098	R2 (U)	SW	Pest	Methoxychlor	-	-	UJ	CRD	Calibration verification %D outside QC criteria
1503098	R3 (D)	SW	Pest	alpha-BHC	-	-	UJ	CRD	Calibration verification %D outside QC criteria
1503098	R3 (D)	SW	Pest	beta-BHC	-	-	UJ	CRD	Calibration verification %D outside QC criteria
1503098	R3 (D)	SW	Pest	gamma-BHC	-	-	UJ	CRD	Calibration verification %D outside QC criteria
1503098	R3 (D)	SW	Pest	Endrin	-	-	UJ	CRD	Calibration verification %D outside QC criteria
1503098	R3 (D)	SW	Pest	4,4'-DDT	-	-	UJ	CRD	Calibration verification %D outside QC criteria
1503098	R3 (D)	SW	Pest	Methoxychlor	-	-	UJ	CRD	Calibration verification %D outside QC criteria

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**TABLE A-2  
SUMMARY OF DATA QUALIFICATIONS  
SECOND BASELINE PHASE  
SHARKEY LANDFILL**

SDG	Field ID	Matrix	Analysis	Analyte	New Result	New RL	Qual	Golder Qual Code	Comments
1503098	R4 (D)	SW	Pest	alpha-BHC	-	-	UJ	CRD	Calibration verification %D outside QC criteria
1503098	R4 (D)	SW	Pest	beta-BHC	-	-	UJ	CRD	Calibration verification %D outside QC criteria
1503098	R4 (D)	SW	Pest	gamma-BHC	-	-	UJ	CRD	Calibration verification %D outside QC criteria
1503098	R4 (D)	SW	Pest	Endrin	-	-	UJ	CRD	Calibration verification %D outside QC criteria
1503098	R4 (D)	SW	Pest	4,4'-DDT	-	-	UJ	CRD	Calibration verification %D outside QC criteria
1503098	R4 (D)	SW	Pest	Methoxychlor	-	-	UJ	CRD	Calibration verification %D outside QC criteria
1503098	W1 (U)	SW	Pest	alpha-BHC	-	-	UJ	CRD	Calibration verification %D outside QC criteria
1503098	W1 (U)	SW	Pest	beta-BHC	-	-	UJ	CRD	Calibration verification %D outside QC criteria
1503098	W1 (U)	SW	Pest	gamma-BHC	-	-	UJ	CRD	Calibration verification %D outside QC criteria
1503098	W1 (U)	SW	Pest	Endrin	-	-	UJ	CRD	Calibration verification %D outside QC criteria
1503098	W1 (U)	SW	Pest	4,4'-DDT	-	-	UJ	CRD	Calibration verification %D outside QC criteria
1503098	W1 (U)	SW	Pest	Methoxychlor	-	-	UJ	CRD	Calibration verification %D outside QC criteria
1503098	W2 (U)	SW	Pest	alpha-BHC	-	-	UJ	CRD	Calibration verification %D outside QC criteria
1503098	W2 (U)	SW	Pest	beta-BHC	-	-	UJ	CRD	Calibration verification %D outside QC criteria
1503098	W2 (U)	SW	Pest	gamma-BHC	-	-	UJ	CRD	Calibration verification %D outside QC criteria
1503098	W2 (U)	SW	Pest	Endrin	-	-	UJ	CRD	Calibration verification %D outside QC criteria
1503098	W2 (U)	SW	Pest	4,4'-DDT	-	-	UJ	CRD	Calibration verification %D outside QC criteria
1503098	W2 (U)	SW	Pest	Methoxychlor	-	-	UJ	CRD	Calibration verification %D outside QC criteria
1503098	W3 (U)	SW	Pest	alpha-BHC	-	-	UJ	CRD	Calibration verification %D outside QC criteria
1503098	W3 (U)	SW	Pest	beta-BHC	-	-	UJ	CRD	Calibration verification %D outside QC criteria
1503098	W3 (U)	SW	Pest	gamma-BHC	-	-	UJ	CRD	Calibration verification %D outside QC criteria
1503098	W3 (U)	SW	Pest	Endrin	-	-	UJ	CRD	Calibration verification %D outside QC criteria
1503098	W3 (U)	SW	Pest	4,4'-DDT	-	-	UJ	CRD	Calibration verification %D outside QC criteria
1503098	W3 (U)	SW	Pest	Methoxychlor	-	-	UJ	CRD	Calibration verification %D outside QC criteria
1503098	W4 (U)	SW	Pest	alpha-BHC	-	-	UJ	CRD	Calibration verification %D outside QC criteria
1503098	W4 (U)	SW	Pest	beta-BHC	-	-	UJ	CRD	Calibration verification %D outside QC criteria
1503098	W4 (U)	SW	Pest	gamma-BHC	-	-	UJ	CRD	Calibration verification %D outside QC criteria
1503098	W4 (U)	SW	Pest	Endrin	-	-	UJ	CRD	Calibration verification %D outside QC criteria
1503098	W4 (U)	SW	Pest	4,4'-DDT	-	-	UJ	CRD	Calibration verification %D outside QC criteria
1503098	W4 (U)	SW	Pest	Methoxychlor	-	-	UJ	CRD	Calibration verification %D outside QC criteria
1503098	W5 (U/D)	SW	Pest	alpha-BHC	-	-	UJ	CRD	Calibration verification %D outside QC criteria
1503098	W5 (U/D)	SW	Pest	beta-BHC	-	-	UJ	CRD	Calibration verification %D outside QC criteria
1503098	W5 (U/D)	SW	Pest	gamma-BHC	-	-	UJ	CRD	Calibration verification %D outside QC criteria
1503098	W5 (U/D)	SW	Pest	Endrin	-	-	UJ	CRD	Calibration verification %D outside QC criteria
1503098	W5 (U/D)	SW	Pest	4,4'-DDT	-	-	UJ	CRD	Calibration verification %D outside QC criteria
1503098	W5 (U/D)	SW	Pest	Methoxychlor	-	-	UJ	CRD	Calibration verification %D outside QC criteria
1503098	W6 (D)	SW	Pest	alpha-BHC	-	-	UJ	CRD	Calibration verification %D outside QC criteria
1503098	W6 (D)	SW	Pest	beta-BHC	-	-	UJ	CRD	Calibration verification %D outside QC criteria
1503098	W6 (D)	SW	Pest	gamma-BHC	-	-	UJ	CRD	Calibration verification %D outside QC criteria
1503098	W6 (D)	SW	Pest	Endrin	-	-	UJ	CRD	Calibration verification %D outside QC criteria
1503098	W6 (D)	SW	Pest	4,4'-DDT	-	-	UJ	CRD	Calibration verification %D outside QC criteria
1503098	W6 (D)	SW	Pest	Methoxychlor	-	-	UJ	CRD	Calibration verification %D outside QC criteria
1503098	FDSW-033015	SW	VOCs	Chloroform	-	-	J	SH	Surrogate recovery above QC criteria
1503098	R4 (D)	SW	VOCs	Chloroform	-	-	J	SH	Surrogate recovery above QC criteria

Checked by: PLL 6/5/2015

**TABLE A-2  
SUMMARY OF DATA QUALIFICATIONS  
SECOND BASELINE PHASE  
SHARKEY LANDFILL**

SDG	Field ID	Matrix	Analysis	Analyte	New Result	New RL	Qual	Golder Qual Code	Comments
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Notes:

%D = Percent Difference.

GW= Groundwater

J = Result is estimated.

MS/MSD = Matrix Spike and Matrix Spike Duplicate

Pest = Pesticides

QC = Quality Control.

Qual = Qualifier

R = Sample result is rejected.

RL = Reporting limit

RRF = Relative response factor.

SDG = sample delivery group

SVOCs = Semivolatile Organic Compounds

SW = Surface water

U = Non-detect.

UJ = Non-detected result is estimated.

VOCs = Volatile Organic Compounds

Golder Codes:

CBC Continuing Calibration Blank contamination

CRD Calibration verification %D

IRF Initial Calibration RRF &lt; QC Limits

PB Preparation blank contamination

PD Percent difference between columns &gt; 25%

RB Rinsate blank contamination

SH Surrogate recovery above quality control limits

Checked by: PLL 6/5/2015

**APPENDIX B**

**SUMMARY OF VALIDATED DATA, DETECTED ANALYTICAL TEST RESULTS  
SECOND QUARTER OF THE SECOND BASELINE PHASE - NORTH AND SOUTH FILLS**

4

# GROUNDWATER DATA



June 2015

Summary of Validated Data  
Detected Analytical Results  
Volatile Organic Compounds  
Second Quarter of the Second Baseline Phase - North and South Fills  
Sharkey Landfill

943-6198-003

Sample ID Sample Date N=Normal; FD=Field Duplicate			M-1 2/27/2015 N	M-2 2/27/2015 N	M-3 2/27/2015 N	M-4 2/26/2015 N	M-5 2/26/2015 N	M-6 2/27/2015 N	M-8 2/26/2015 N	M-9A 2/27/2015 N	M-10 2/27/2015 N	M-10 2/27/2015 FD	M-11 2/25/2015 N	M-12 2/26/2015 N		
Parameter	Units	Well Trigger	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
1,1-Dichloroethane	ug/L															
1,2-Dichlorobenzene	ug/L															
1,2-Dichloroethane	ug/L															
1,3-Dichlorobenzene	ug/L															
1,4-Dichlorobenzene	ug/L															
1,4-Dioxane	ug/L		110	J			1100	J	57	J	140	J				
Acetone	ug/L		8.6	J	4.3	J		100	3.6	J	3.9	J			350	J
Benzene <sup>1</sup>	ug/L	50	2.8	J			4.6	J	3.2	J	7.7			6.1	J	
Chlorobenzene	ug/L		21			35			44		57			11		
Chloroethane	ug/L													9.7		
cis-1,2-Dichloroethene	ug/L															
Cyclohexane	ug/L															
Isopropylbenzene	ug/L		2.1	J			1.3	J	0.57	J	2.3	J			15	
m,p-Xylenes	ug/L		1.2	J			1.2	J						0.5	J	
Methyl Cyclohexane	ug/L													0.95	J	
Methyl tert-Butyl Ether	ug/L															
o-Xylene	ug/L		0.72	J			2.2	J	0.89	J						
Toluene	ug/L		0.39	J						0.41	J					
Total VOC	ug/L	1000	146.81		4.3		35	1209.3	109.26		211.31	J			393.25	

1. The well trigger for benzene for the Whippany River = 100 ug/L.
2. Exceedances are in bold.

Checked by:AJV 6/5/15

June 2015

Summary of Validated Data  
Detected Analytical Results  
Volatile Organic Compounds  
Second Quarter of the Second Baseline Phase - North and South Fills  
Sharkey Landfill

943-6198-003

Sample ID Sample Date N=Normal; FD=Field Duplicate			M-13 2/25/2015 N		M-14 2/25/2015 N		M-15 2/25/2015 N		M-16 2/25/2015 N		M-27 2/27/2015 N	
Parameter	Units	Well Trigger	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
1,1-Dichloroethane	ug/L				0.58	J						
1,2-Dichlorobenzene	ug/L						3.9	J				
1,2-Dichloroethane	ug/L				0.54	J						
1,3-Dichlorobenzene	ug/L						0.53	J				
1,4-Dichlorobenzene	ug/L						3.7	J				
1,4-Dioxane	ug/L		48	J	520	J					340	J
Acetone	ug/L										4.8	J
Benzene <sup>1</sup>	ug/L	50									10	
Chlorobenzene	ug/L						25				25	
Chloroethane	ug/L										2	J
cis-1,2-Dichloroethene	ug/L		2.5	J	1.1	J						
Cyclohexane	ug/L								0.67	J		
Isopropylbenzene	ug/L										0.86	J
m,p-Xylenes	ug/L										0.57	J
Methyl Cyclohexane	ug/L											
Methyl tert-Butyl Ether	ug/L								0.71	J		
o-Xylene	ug/L										0.57	J
Toluene	ug/L											
Total VOC	ug/L	1000	50.5		522.22		33.13		0.71		383.8	

1. The well trigger for benzene for the Whippany River = 100 ug/L.
2. Exceedances are in bold.

Checked by:AJV 6/5/15



June 2015

Summary of Validated Data  
Detected Analytical Results  
Semivolatile Organic Compounds  
Second Quarter of the Second Baseline Phase - North and South Fills  
Sharkey Landfill

943-6198-003

Sample ID Sample Date N=Normal; FD=Field Duplicate			M-1 2/27/2015 N		M-2 2/27/2015 N		M-3 2/27/2015 N		M-4 2/26/2015 N		M-5 2/26/2015 N		M-6 2/27/2015 N		M-8 2/26/2015 N		M-9A 2/27/2015 N	
Parameter	Units	Well Trigger	Result Qual		Result Qual		Result Qual		Result Qual		Result Qual		Result Qual		Result Qual		Result Qual	
Naphthalene	ug/L		2.2	J														

Checked by:AJV 6/5/15

June 2015

Summary of Validated Data  
Detected Analytical Results  
Semivolatile Organic Compounds  
Second Quarter of the Second Baseline Phase - North and South Fills  
Sharkey Landfill

943-6198-003

Sample ID Sample Date N=Normal; FD=Field Duplicate			M-10 2/27/2015 N		M-10 2/27/2015 FD		M-11 2/25/2015 N		M-12 2/26/2015 N		M-13 2/25/2015 N		M-14 2/25/2015 N		M-15 2/25/2015 N		M-16 2/25/2015 N		M-27 2/27/2015 N	
Parameter	Units	Well Trigger	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
Naphthalene	ug/L																			

Checked by:AJV 6/5/15

June 2015

Summary of Validated Data  
Detected Analytical Results  
Pesticides/PCBs

943-6198-003

Second Quarter of the Second Baseline Phase - North and South Fills  
Sharkey Landfill

Sample ID Sample Date N=Normal; FD=Field Duplicate			M-1 2/27/2015 N		M-2 4/16/2015 N		M-3 2/27/2015 N		M-4 2/26/2015 N		M-5 2/26/2015 N		M-6 2/27/2015 N		M-8 2/26/2015 N		M-9A 2/27/2015 N		M-10 2/27/2015 N	
Parameter	Units	Well Trigger	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
beta-BHC	ug/L						0.057	J												
delta-BHC	ug/L		0.028	J																
gamma-BHC	ug/L								0.011	J										
Heptachlor Epoxide	ug/L						0.032	J												
Aroclor-1248	ug/L						0.70	J												

Checked by:AJV 6/5/15



June 2015

Summary of Validated Data  
 Detected Analytical Results  
 Pesticides/PCBs  
 Second Quarter of the Second Baseline Phase - North and South Fills  
 Sharkey Landfill

943-6198-003

Sample ID Sample Date N=Normal; FD=Field Duplicate			M-10 2/27/2015 FD		M-11 2/25/2015 N		M-12 2/26/2015 N		M-13 2/25/2015 N		M-14 2/25/2015 N		M-15 2/25/2015 N		M-16 2/25/2015 N		M-27 2/27/2015 N	
Parameter	Units	Well Trigger	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
beta-BHC	ug/L																	
delta-BHC	ug/L																	
gamma-BHC	ug/L																	
Heptachlor Epoxide	ug/L																	
Aroclor-1248	ug/L																	

Checked by:AJV 6/5/15

June 2015

Summary of Validated Data  
Detected Analytical Results  
Inorganics

943-6198-003

Second Quarter of the Second Baseline Phase - North and South Fills  
Sharkey Landfill

Sample ID Sample Date N=Normal; FD=Field Duplicate			M-1 2/27/2015 N		M-2 2/27/2015 N		M-2 4/16/2015 N		M-3 2/27/2015 N		M-4 2/26/2015 N		M-5 2/26/2015 N		M-6 2/27/2015 N		M-8 2/26/2015 N		M-9A 2/27/2015 N		M-10 2/27/2015 N	
Parameter	Units	Well Trigger	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
Aluminum	ug/L		269		159	J			98.4	J	258		252		24.1	J	120	J	15.8	J	34.3	J
Arsenic	ug/L	50	2.4	J							4.4	J			36.7				4.1	J	6.2	J
Barium	ug/L	1000	407		137	J			201		507		266		307		44.9	J	171	J	29.3	J
Cadmium	ug/L	10			0.96	J																
Calcium	ug/L		61900		196000				148000		137000		113000		127000		82800		59100		61800	
Chromium	ug/L	50	10.3		0.69	J			0.64	J	37.6		2.2	J	2.8	J					3	J
Cobalt	ug/L		12.8	J					1.5	J	47.1	J	2.9	J	4.6	J	2.2	J	4.6	J	1.7	J
Copper	ug/L		1.2	J	11.8	J			1.2	J	4.3	J	1.1	J			3.4	J			1.6	J
Cyanide	ug/L						4.7	J	2.1	J	8.5	J										
Iron	ug/L		14800		10100				4810		10400		21500		59100		2600		19600		13500	
Magnesium	ug/L		42400		18000				20200		75000		40200		43600		18300		16700		16300	
Manganese	ug/L		577		455				471		209		888		962		148		2710		1790	
Nickel	ug/L		45.4		52.2				2.5	J	182		9.5	J	20.4	J	7.3	J	3	J	6.1	J
Potassium	ug/L		116000		7090				10900		197000		32200		46600		4380	J	8090		2080	J
Sodium	ug/L		427000		9840				12300		940000		91600		133000		7740		106000		36000	
Vanadium	ug/L		14.1	J							64.1		2.5	J								
Zinc	ug/L		14.2	J	251				18.2	J	26.7	J			4.2	J	5.5	J			5.1	J

Checked by:AJV 6/5/15

June 2015

Summary of Validated Data  
Detected Analytical Results  
Inorganics

943-6198-003

Second Quarter of the Second Baseline Phase - North and South Fills  
Sharkey Landfill

Sample ID Sample Date N=Normal; FD=Field Duplicate			M-10 2/27/2015 FD		M-11 2/25/2015 N		M-12 2/26/2015 N		M-13 2/25/2015 N		M-14 2/25/2015 N		M-15 2/25/2015 N		M-16 2/25/2015 N		M-27 2/27/2015 N	
Parameter	Units	Well Trigger	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
Aluminum	ug/L		29.9	J	40.7	J	49.7	J	75.6	J	105	J	45.6	J	91	J	18.5	J
Arsenic	ug/L	50	7.6	J	46.5				39.5		14.2		30.8		9.3	J		
Barium	ug/L	1000	30.8	J	428		104	J	331		304		126	J	459		377	
Cadmium	ug/L	10					0.28	J										
Calcium	ug/L		61300		39800		88700		105000		80600		83300		144000		109000	
Chromium	ug/L	50	1.8	J	5.8	J											2.8	J
Cobalt	ug/L		2.2	J	23.4	J			2.4	J	2.3	J	1.4	J	1.8	J	7.4	J
Copper	ug/L		2.4	J			9.4	J	1.8	J	0.73	J			1.1	J	1.4	J
Cyanide	ug/L				2.4	J											1.7	J
Iron	ug/L		14500		5660		483		4630		4170		10400		2790		15800	
Magnesium	ug/L		16200		44100		14400		34600		26500		18500		42900		51100	
Manganese	ug/L		1900		44.1		173		240		429		120		243		860	
Nickel	ug/L		7.5	J	91.9		8.4	J	10.5	J	6.2	J	4.5	J	5.5	J	35.8	J
Potassium	ug/L		2150	J	94700		3490	J	29100		21100		16400		19200		68500	
Sodium	ug/L		36000		445000		40000		166000		123000		74500		106000		238000	
Vanadium	ug/L				4.4	J											2.3	J
Zinc	ug/L		6.7	J	15.5	J	24.8	J									3.4	J

Checked by: AJV 6/5/15



**SURFACE WATER DATA**

June 2015

Summary of Validated Data  
Detected Analytical Results  
Volatile Organic Compounds  
Second Quarter of the Second Baseline Phase - Surface Water  
Sharkey Landfill

943-6198-003

Sample ID Sample Date N=Normal; FD=Field Duplicate			R1(U) 3/30/2015 N		R2(U) 3/30/2015 N		R3(D) 3/30/2015 N		R4(D) 3/30/2015 N		W1(U) 3/30/2015 N		W2(U) 3/30/2015 N		W3(D) 3/30/2015 N	
Parameter	Units	River Trigger	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
Chloroform	ug/L	5.7	0.067	J	0.071	J	0.081	J	0.09	J						
Methylene Chloride	ug/L	5.7													0.21	J
Toluene	ug/L	6800													0.16	J

Checked by: AJV 6/3/2015

June 2015

Summary of Validated Data  
Detected Analytical Results  
Volatile Organic Compounds  
Second Quarter of the Second Baseline Phase - Surface Water  
Sharkey Landfill

943-6198-003

Sample ID Sample Date N=Normal; FD=Field Duplicate			R1(U) 3/30/2015 N		R2(U) 3/30/2015 N		R3(D) 3/30/2015 N		W4(U) 3/30/2015 N		W5(U/D) 3/30/2015 N		W6(D) 3/30/2015 N		W6(D) 3/30/2015 FD	
Parameter	Units	River Trigger	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
Chloroform	ug/L	5.7	0.067	J	0.071	J	0.081	J							0.16	J
Methylene Chloride	ug/L	5.7														
Toluene	ug/L	6800														

Checked by: AJV 6/3/2015

June 2015

Summary of Validated Data  
 Detected Analytical Results - Semivolatile Organic Compounds  
 Second Quarter of the Second Baseline Phase - Surface Water  
 Sharkey Landfill

943-6198-003

Sample ID Sample Date N=Normal; FD=Field Duplicate			R1(U) 3/30/2015 N	R2(U) 3/30/2015 N	R3(U) 3/30/2015 N	R4(D) 3/30/2015 N	W1(U) 3/30/2015 N	W2(U) 3/30/2015 N	W3(D) 3/30/2015 N	W4(U) 3/30/2015 N
Parameter	Units	River Trigger	Result	Qual	Result	Qual	Result	Qual	Result	Qual
Bis(2-ethylhexyl) Phthalate	ug/L								2.4	J

Checked by: AJV 6/3/2015



June 2015

Summary of Validated Data  
Detected Analytical Results - Semivolatile Organic Compounds  
Second Quarter of the Second Baseline Phase - Surface Water  
Sharkey Landfill

943-6198-003

Sample ID Sample Date N=Normal; FD=Field Duplicate			W5(U/D) 3/30/2015 N		W6(D) 3/30/2015 N		W6(D) 3/30/2015 FD	
Parameter	Units	River Trigger	Result Qual		Result Qual		Result Qual	
Bis(2-ethylhexyl) Phthalate	ug/L							

Checked by: AJV 6/3/2015

June 2015

Summary of Validated Data  
Detected Analytical Results  
Pesticides/PCBs  
Second Quarter of the Second Baseline Phase - Surface Water  
Sharkey Landfill

943-6198-003

Sample ID Sample Date N=Normal; FD=Field Duplicate			R1(U) 3/30/2015 N		R2(U) 3/30/2015 N		R3(U) 3/30/2015 N		R4(D) 3/30/2015 N		W1(U) 3/30/2015 N		W2(U) 3/30/2015 N		W3(D) 3/30/2015 N		W4(U) 3/30/2015 N		W5(U/D) 3/30/2015 N		W6(D) 3/30/2015 N		W6(D) 3/30/2015 FD	
Parameter	Units	River Trigger	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
No Analytes Detected																								

Checked by: AJV 6/3/2015



June 2015

Summary of Validated Data  
Detected Analytical Results  
Inorganics  
Second Quarter of the Second Baseline Phase - Surface Water  
Sharkey Landfill

943-6198-003

Sample ID Sample Date N=Normal; FD=Field Duplicate			R1(U) 3/30/2015 N		R2(U) 3/30/2015 N		R3(D) 3/30/2015 N		R4(D) 3/30/2015 N		W1(U) 3/30/2015 N		W2(U) 3/30/2015 N		W3(D) 3/30/2015 N		W4(U) 3/30/2015 N		W5(U/D) 3/30/2015 N		W6(D) 3/30/2015 N		W6(D) 3/30/2015 FD	
Parameter	Units	River Trigger	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
Aluminum	ug/L		81.6	J	170	J	91.4	J	94.2	J	67.4	J	115	J	131	J	132	J	137	J	126	J	117	J
Barium	ug/L		22.6	J	22.4	J	20.9	J	22.7	J	27.2	J	35.3	J	36.2	J	37.2	J	38.1	J	35.9	J	35.2	J
Cadmium	ug/L				0.4	J																		
Calcium	ug/L		24200		24400		23200		24800		35900		38100		38800		37700		37900		44100		42900	
Cyanide	ug/L											2.2	J			2.2	J							
Iron	ug/L		219		344		222		227		381		442		454		471		530		390		387	
Magnesium	ug/L		7950		7920		7610		8140		11100		11700		12000		11500		11600		13700		13300	
Manganese	ug/L		41.3		53.4		40.2		42.4		63.5		80.2		80.8		86		91.5		74.6		72.8	
Nickel	ug/L		1.6	J	2.7	J	2	J	2.3	J	1.9	J					2.6	J	1.8	J	2.1	J	2.1	J
Selenium	ug/L		4.4	J			5.4	J															5.8	J
Sodium	ug/L		71200		71200		68000		73200		131000		127000		129000		126000		126000		133000		129000	

Checked by: AJV 6/3/2015

**APPENDIX C**  
**NJDEP HZSITE ELECTRONIC DATA DELIVERABLE**  
**SECOND QUARTER OF THE SECOND BASELINE PHASE - NORTH AND SOUTH FILLS**  
**(SUBMITTED ELECTRONICALLY TO NJDEP)**



**APPENDIX D**  
**EPA REGION II ELECTRONIC DATA DELIVERABLE**  
**SECOND QUARTER OF THE SECOND BASELINE PHASE - NORTH AND SOUTH FILLS**  
**(SUBMITTED ELECTRONICALLY TO USEPA REGION II)**

At Golder Associates we strive to be the most respected global group of companies specializing in ground engineering and environmental services. Employee owned since our formation in 1960, we have created a unique culture with pride in ownership, resulting in long-term organizational stability. Golder professionals take the time to build an understanding of client needs and of the specific environments in which they operate. We continue to expand our technical capabilities and have experienced steady growth with employees now operating from offices located throughout Africa, Asia, Australasia, Europe, North America and South America.

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